Oecologia

Volume 90 1992

In Cooperation with the
International Association for Ecology (Intecol)

Editors in Chief

J.R. Ehleringer, Salt Lake City
C.H. Peterson, Morehead City
M. Schaefer, Göttingen
E.-D. Schulze, Bayreuth

Editorial Board

F. Bairlein, Wilhelmshaven
F.A. Bazzaz, Cambridge
F. Berendse, Wageningen
J. Blondel, Montpellier
J.J. Burdon, Canberra
M.M. Caldwell, Logan
B. Casper, Philadelphia
F.S. Chapin III, Berkeley
P.D. Coley, Salt Lake City
L. Crowder, Raleigh
E. Cuevas, Caracas
P.J. Den Boer, Wijster
P.R. Ehrlich, Stanford
H.C.J. Godfray, Ascot
I. Hanski, Helsinki
J.L. Harper, Bangor
C. Herrera, Sevilla
T. Hirose, Sendai
P.M. Kareiva, Seattle
G.J. Kenagy, Seattle
T. Kikuchi, Amakusa
J. Kingsolver, Seattle
C. Körner, Basel
O.L. Lange, Würzburg
J.H. Lawton, Ascot
S. Louda, Lincoln
P. Miles, Glen Osmond
R. Monson, Boulder
H. Mooney, Stanford
P.A. Morrow, Minneapolis
D. Neumann, Köln
R. Oren, Durham
C. Otto, Umea
J.S. Pate, Nedsland
R.W. Pearcy, Davis
S.L. Pimm, Knoxville
Th.W. Schoener, Davis
V. Sork, St. Louis
A.J. Tessier, Hickory Corners
J.A. Travis, Tallahassee
N.C. Turner, Wembley
S. Ulfstrand, Uppsala
P. Vitousek, Stanford
A. Watkinson, Norwich
T.C.R. White, Glen Osmond
W. Wieser, Innsbruck
D.H. Wise, Baltimore
Ch. Wissel, Marburg
H. Wolda, Panama
H. Ziegler, München
H. Zwölfer, Bayreuth

Springer International

Oecologia

Derived from *"Zeitschrift für Morphologie und Ökologie der Tiere"*, *Oecologia* was founded in 1968, volumes (1968–1982), and edited by H. Remmert. As of volume 53 (1982) the journal has been edited by both H. Remmert and E.-D. Schulze. As of volume 81 (1989) the journal has been edited by J.R. Ehleringer, Salt Lake City; C.H. Peterson, Morehead City; H. Remmert, Marburg; E.-D. Schulze, Bayreuth. As of volume 83 (1990) the journal has been edited by J.R. Ehleringer, Salt Lake City; C.H. Peterson, Morehead City; M. Schaefer, Göttingen; E.-D. Schulze, Bayreuth.

Submission of a manuscript implies: that the work described has not been published before (except in the form of an abstract or as part of a published lecture, review, or thesis); that it is not under consideration for publication elsewhere; that its publication has been approved by all coauthors, if any, as well as by the responsible authorities at the institute where the work has been carried out; that, if and when the manuscript is accepted for publication, the authors agree to automatic transfer of the copyright to the publisher; and that the manuscript will not be published elsewhere in any language without the consent of the copyright holders.

All articles published in this journal are protected by copyright, which covers the exclusive rights to reproduce and distribute the article (e.g., as offprints), as well as all translation rights. No material published in this journal may be reproduced photographically or stored on microfilm, in electronic data bases, video disks, etc., without first obtaining written permission from the publisher.

The use of general descriptive names, trade names, trademarks, etc., in this publication, even if not specifically identified, does not imply that these names are not protected by the relevant laws and regulations.

While the advice and information in this journal is believed to be true and accurate at the date of its going to press, neither the authors, the editors, nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Special regulations for photocopies in the USA: Photocopies may be made for personal or in-house use beyond the limitations stipulated under Section 107 or 108 of U.S. Copyright Law, provided a fee is paid. This fee is US $0.20 per page per copy, plus a basic fee of US $2.00 per article. All fees should be paid to the Copyright Clearance Center, Inc., 21 Congress Street, Salem, MA 01970, USA, stating the ISSN 0029-8549, the volume, and the first and last page numbers of each article copied. The copyright owner's consent does not include copying for general distribution, promotion, new works, or resale. In these cases, specific written permission must first be obtained from the publisher.

Printers: Universitätsdruckerei H. Stürtz AG, Würzburg
© Springer-Verlag Berlin Heidelberg 1992
Springer-Verlag GmbH & Co. KG, W-1000 Berlin 33
Printed in Germany

Contents

Abrahamson WG → Horner JD
Adams III WW, Volk M, Hoehn A, Demmig-Adams B: Leaf orientation and the response of the xanthophyll cycle to incident light 404
Alberti G → Köhler H-R
Allainé D → Gaillard J-M
Andrews RH → Chilton NB
Apanius V → Casper BB
Arco JM del → Escudero A
Arenovski AL, Howes BL: Lacunal allocation and gas transport capacity in the salt marsh grass *Spartina alterniflora* 316
Arts MT, Evans MS, Robarts RD: Seasonal patterns of total and energy reserve lipids of dominant zooplanktonic crustaceans from a hyper-eutrophic lake 560
Ayala J → Escudero A

Bazzaz FA → Miao SL
Bazzaz FA → Reekie EG
Ben-Shahar R, Coe MJ: The relationships between soil factors, grass nutrients and the foraging behaviour of wildebeest and zebra 422
Bergelson J, Crawley MJ: The effects of grazers on the performance of individuals and populations of scarlet gilia, *Ipomopsis aggregata* 435
Bigalke RC → Seydack AHW
Blouin MS: Comparing bivariate reaction norms among species: time and size at metamorphosis in three species of *Hyla* (Anura: Hylidae) 288
Boer PJ den → Dijk TS van
Bouwmeester HJ, Karssen CM: The dual role of temperature in the regulation of the seasonal changes in dormancy and germination of seeds of *Polygonum persicaria* L. 88
Bradshaw WE, Holzapfel CM: Resource limitation, habitat segregation, and species interactions of british tree-hole mosquitoes in nature 227
Brandt S → Gaillard J-M
Bull CM → Chilton NB
Burdon JJ, Wennström A, Ericson L, Müller WJ, Morton R: Density-dependent mortality in *Pinus sylvestris* caused by the snow blight pathogen *Phacidium infestans* 74

Calow P → Glazier DS
Carey PD, Fitter AH, Watkinson AR: A field study using the fungicide benomyl to investigate the effect of mycorrhizal fungi on plant fitness 550
Carlsson U, Elmqvist T: Epidemiology of anther-smut disease (*Microbotryum violaceum*) and numeric regulation of populations of *Silene dioica* 509
Casper BB, Heard SB, Apanius V: Ecological correlates of single-seededness in a woody tropical flora 212
Chapin III FS → Pugnaire FI
Chilton NB, Bull CM, Andrews RH: Niche segregation in reptile ticks: attachment sites and reproductive success of females 255
Coe MJ → Ben-Shahar R
Coffin J → Hemptinne J-L
Combes C → Guégan J-F
Crawley MJ → Bergelson J
Crowley PH: Density dependence, boundedness, and attraction: detecting stability in stochastic systems 246
Crowley PH, Johnson DM: Variability and stability of a dragonfly assemblage 260

Degen AA, Pinshow B, Kam M: Field metabolic rates and water influxes of two sympatric Gerbillidae: *Gerbillus allenbyi* and *G. pyramidum* 586
Demmig-Adams B → Adams III WW
Devol AH → Martinelli LA
Dijk TS van, Boer PJ den: The life histories and population dynamics of two carabid species on a Dutch heathland 340
Dixon AFG → Hemptinne J-L
Duffy JE, Paul VJ: Prey nutritional quality and the effectiveness of chemical defenses against tropical reef fishes 333
Du Plessis MA: Obligate cavity-roosting as a constraint on dispersal of green (red-billed) woodhoopoes: consequences for philopatry and the likelihood of inbreeding 205

Elmqvist T → Carlsson U
Erhardt A: Preferences and non-preferences for nectar constituents in *Ornithoptera priamus poseidon* (Lepidoptera, Papilionidae) 581
Ericson L → Burdon JJ
Erlandsson A: Asymmetric interactions in semiaquatic insects 153
Escudero A, Arco JM del, Sanz IC, Ayala J: Effects of leaf longevity and retranslocation efficiency on the retention time of nutrients in the leaf biomass of different woody species 80
Euzet L → Guégan J-F
Evans MS → Arts MT

Fitter AH → Carey PD
Fox JF: Pollen limitation of reproductive effort in willows 283
French K: Phenology of fleshy fruits in a wet sclerophyll forest in southeastern Australia: are birds an important influence? 366

Gaillard J-M, Pontier D, Brandt S, Jullien J-M, Allainé D: Sex differentiation in postnatal growth rate: a test in a wild boar population 167
Garten CT Jr, Taylor GE Jr: Foliar $\delta^{13}C$ within a temperate deciduous forest: spatial, temporal, and species sources of variation 1
Gaston KJ, Warren PH, Hammond PM: Predator: non-predator ratios in beetle assemblages 417
Gibson RN → Kaiser MJ
Ginocchio R, Montenegro G: Interpretation of metameric architecture in dominant shrubs of the Chilean matorral 451
Glazier DS, Calow P: Energy alloeation rules in *Daphnia magna:* clonal and age differences in the effects of food limitation 540
Grace JB, Keough J, Guntenspergen GR: Size bias in traditional analyses of substitutive competition experiments 429
Guégan J-F, Lambert A, Lévêque C, Combes C, Euzet L: Can host body size explain the parasite species richness in tropical freshwater fishes? 197
Guntenspergen GR → Grace JB
Gutiérrez JR: Effects of low water supplementation and nutrient addition on the aboveground biomass production of annual plants in a Chilean coastal desert site 556

Hammond PM → Gaston KJ
Hansen A, Pate JS, Hansen AP: Growth, reproductive performance and resource allocation of the herbaceous obligate seeder *Gompholobium marginatum* R. Br. (Fabaceae) 158
Hansen AP → Hansen A
Hartnett DC → Vinton MA
Heard SB → Casper BB
Heinemann D: Resource use, energetic profitability, and behavioral decisions in migrant rufous hummingbirds 137
Helbig AJ: Population differentiation of migratory directions in birds: comparison between ringing results and orientation behaviour of hand-raised migrants 483
Hemptinne J-L, Dixon AFG, Coffin J: Attack strategy of ladybird beetles (Coccinellidae): factors shaping their numerical response 238
Hertz PE: Evaluating thermal resource partitioning. By sympatric lizards *Anolis cooki* and *A. cristatellus*: a field test using null hypotheses 127
Hodgkinson KC: Water relations and growth of shrubs before and after fire in a semi-arid woodland 467
Hoehn A → Adams III WW

Holzapfel CM → Bradshaw WE
Horner JD, Abrahamson WG: Influence of plant genotype and environment on oviposition preference and offspring survival in a gallmaking herbivore 323
Howes BL → Arenovski AL
Hughes RN → Kaiser MJ
Husby M → Slagsvold T

Jedrzejewska B → Jedrzejewski W
Jedrzejewski W, Jedrzejewska B, Okarma H, Ruprecht AL: Wolf predation and snow cover as mortality factors in the ungulate community of the Bialowieza National Park, Poland 27
Johnson DM → Crowley PH
Jullien J-M → Gaillard J-M
Jung I, Winter K: Mineral nutrient deficiency increases the sensitivity of photosynthesis to sulphur dioxide in needles of a coniferous tree, *Abies nordmanniana* 70

Kaiser MJ, Westhead AP, Hughes RN, Gibson RN: Are digestive characteristics important contributors to the profitability of prey? 61
Kam M → Degen AA
Karssen CM → Bouwmeester HJ
Keough J → Grace JB
Köhler H-R, Storch V, Alberti G: The impact of lead on the assimilation efficiency of laboratory-held Diplopoda (Arthropoda) preconditioned in different environmental situations 113
Koide RT, Lu X: Mycorrhizal infection of wild oats: maternal effects on offspring growth and reproduction 218
Kool KM: Food selection by the silver leaf monkey, *Trachypithecus auratus sondaicus*, in relation to plant chemistry 527
Krause SC, Raffa KF: Comparison of insect, fungal, and mechanically induced defoliation of larch: effects on plant productivity and subsequent host susceptibility 411

Lalonde RG, Roitberg BD: Host selection behavior of a thistle-feeding fly: choices and consequences 534
Lambert A → Guégan J-F
Lévêque C → Guégan J-F
Lin G, Silveira Lobo Sternberg L da: Comparative study of water uptake and photosynthetic gas exchange between scrub and fringe red mangroves, *Rhizophora mangle* L. 399
Lu X → Koide RT

Martinelli LA, Victoria RL, Trivelin PCO, Devol AH, Richey JE: ^{15}N Natural abundance in plants of the Amazon River floodplain and potential atmospheric N_2 fixation 591
Miao SL, Wayne PM, Bazzaz FA: Elevated CO_2 differentially alters the responses of cooccurring birch and maple seedlings to a moisture gradient 300
Mittelbach GG, Osenberg CW, Wainwright PC: Variation in resource abundance affects diet and feeding morphology in the pumpkinseed sunfish (*Lepomis gibbosus*) 8
Mogi M, Yong HS: Aquatic arthropod communities in *Nepenthes* pitchers: the role of niche differentiation, aggregation, predation and competition in community organization 172
Mogi M → Sota T
Montenegro G → Ginocchio R
Moreno JM, Oechel WC: Factors controlling postfire seedling establishment in southern California chaparral 50
Morris WF: The effects of natural enemies, competition, and host plant water availability on an aphid population 359
Morton R → Burdon JJ
Mueller RJ → Wandera JL
Müller WJ → Burdon JJ
Munger JC: Reproductive potential of colonies of desert harvester ants (*Pogonomyrmex desertorum*): effects of predation and food 276

Naidoo G, Naidoo S: Waterlogging responses of *Sporobolus virginicus* (L.) Kunth. 445
Naidoo S → Naidoo G
Niklas KJ: Petiole mechanics, light interception by Lamina, and "Economy in Design" 518
Nyrop JP → Zhang Z-Q

Oechel WC → Moreno JM
Okarma H → Jedrzejewski W
Ólafsson E: Small-scale spatial distribution of marine meiobenthos: the effects of decaying macrofauna 37
Orr BK, Resh VH: Influence of *Myriophyllum aquaticum* cover on *Anopheles* mosquito abundance, oviposition, and larval microhabitat 474
Osenberg CW → Mittelbach GG

Pate JS → Hansen A
Paul VJ → Duffy JE
Pinshow B → Degen AA
Pontier D → Gaillard J-M
Price PW → Wilson Fernandes G
Pugnaire FI, Chapin III FS: Environmental and physiological factors governing nutrient resorption efficiency in barley 120

Raffa KF → Krause SC
Rank NE: Host plant preference based on salicylate chemistry in a willow leaf beetle (*Chrysomela aeneicollis*) 95
Reekie EG, Bazzaz FA: Cost of reproduction as reduced growth in genotypes of two congeneric species with contrasting life histories 21
Resh VH → Orr BK
Richards JH → Wandera JL
Richey JE → Martinelli LA
Robarts RD → Arts MT
Roitberg BD → Lalonde RG
Ross C: Environmental correlates of the intrinsic rate of natural increase in primates 383
Ruprecht AL → Jedrzejewski W

Sanderson JP → Zhang Z-Q
Sandvik J → Slagsvold T
Sanz IC → Escudero A
Schultz BB: Insect herbivores as potential causes of mortality and adaptation in gallforming insects 297
Sebens KP → Witman JD
Seydack AHW, Bigalke RC: Nutritional ecology and life history tactics in the bushpig (*Potamochoerus porcus*): development of an interactive model 102
Silveira Lobo Sternberg L da → Lin G
Sinsch U: Structure and dynamic of a natterjack toad metapopulation (*Bufo calamita*) 489
Slagsvold T, Husby M, Sandvik J: Growth and sex ratio of nestlings in two species of crows: how important is hatching asynchrony? 43
Slotow R → Ward D
So P-M, Takafuji A: Local variation in diapause characteristics of *Tetranychus urticae* Koch (Acarina: Tetranychidae) 270
Sota T, Mogi M: Interspecific variation in desiccation survival time of *Aedes* (*Stegomyia*) mosquito eggs is correlated with habitat and egg size 353
Spiller DA: Relationship between prey consumption and colony size in an orb spider 457
Storch V → Köhler H-R
Sutherland WJ: Game theory models of functional and aggregative responses 150

Takafuji A → So P-M
Tanaka K: Size-dependent survivorship in the web-building spider *Agelena limbata* 597
Taylor GE Jr → Garten CT Jr
Tejedo M: Absence of the trade-off between the size and number of offspring in the natterjack toad (*Bufo calamita*) 294
Trivelin PCO → Martinelli LA

Victoria RL → Martinelli LA
Vinton MA, Hartnett DC: Effects of bison grazing on *Andropogon gerardii* and *Panicum virgatum* in burned and unburned tallgrass prairie 374
Volk M → Adams III WW

Wainwright PC → Mittelbach GG
Wandera JL, Richards JH, Mueller RJ: The relationships between relative growth rate, meristematic potential and compensatory growth of semiarid-land shrubs 391
Ward D, Slotow R: The effects of water availability on the life history of the desert snail, *Trochoidea seetzeni*. An experimental field manipulation 572
Warren PH → Gaston KJ
Watkinson AR → Carey PD
Wayne PM → Miao SL
Wellington GM: Habitat selection and juvenile persistence control the distribution of two closely related Caribbean damselfishes 500

Wennström A → Burdon JJ
Westhead AP → Kaiser MJ
Wilson Fernandes G, Price PW: The adaptive significance of insect gall distribution: survivorship of species in xeric and mesic habitats 14
Winter K → Jung I
Witman JD, Sebens KP: Regional variation in fish predation intensity: a historical perspective in the Gulf of Maine 305
Yong HS → Mogi M
Zhang Z-Q, Sanderson JP, Nyrop JP: Foraging time and spatial patterns of predation in experimental populations, A comparative study of three mite predator-prey systems (Acari: Phytoseiidae, Tetranychidae) 185

Indexed in *Current Contents*

Index of key words

Abies 70
Abiotic factors 340
Adaptations 14
Adenostoma 50
Aerenchyma 316
Age 540
Aggregation 172, 185
Aggregative response 150
Alate 276
Allozymes 489
Amazon river 591
Amino acids 581
Amphibian 294
Anaerobic metabolism 445
Andropogon gerardii 374
Anolis thermal biology 127
Ant 276
Anura 288
Aphanizomenon 560
Aphis varians 359
Architecture 451
Assimilation efficiency 113
Atmospheric nitrogen fixation 591
Attachment sites 255
Attraction 260
Australia 366
Avena fatua L 218

Benomyl 550
Białowieża 27
Biomass 300
Biomechanics 518
Bird migration 483
Body size 197, 597
Boundedness 260
Browsing tolerance 391
Bufo calamita 294, 489

Carbon allocation 411
Carotenoids 404
Ceanothus 50
Chaparral 50
Chemical defenses 333
Chilean Desert 556
Chrysomelidae 95
Climatic adaptation 353
Clipping 391
Clones 540
Coexistence 153
Coleoptera 417
Colobine monkey 527
Coloniality 457
Communities 227
Community 172
Compensatory growth capacity 391
Competition 172, 227, 429, 457
Cooperative breeding 205
Coral reefs 333
Corvus corone 43
$^{13}C/^{12}C$ ratios 1

Damselfishes 500
Daphnia 540
Decaying macrofauna 37
Deciduous forests 1
Density dependence 260
Density-dependence 74
Desert snails 572
Desiccation tolerance 353
Diapause 270
Diet 8
Diet selection 61
Diplopoda 113
Disease establishment 509
Dispersal 205
Dispersal agents 212
Dispersal units 212
Dormancy pattern 88

Ecological constraints 205
Economy in design 518
Egg size 294
Elevated CO_2 300
Energy allocation 540
Energy maximisation 61
Energy reserves 560
Entomophily 283
Ephemeral plants 556
Epidemic development 74
Eurosta solidaginis 323
Eutrophy 560

Facilitation 227
Fecundity 294, 534
Field metabolic rate 586
Fire 50, 158, 374, 467
Fleshy fruit 366
Flooding 445
Flood-plain 591
Food concentration 540
Food selection 527
Foraging behavior 185
Freshwater fish 197
Frugivore abundance 366
Fruiting phenology 366
Fruits 212
Functional morphology 8
Functional response 150

Gall 323
Galls 297
Game theory 150
Gas transport 316
Genetic diversity 489
Genetic variation 270
Gerbillus allenbyi 586
Gerbillus pyramidum 586
Germination 88
Gerris 153
Goldenrod 323
Granivorous desert rodents 586
Grasses 422
Gray birch 300
Grazing 422
Grazing-Bison 374
Growth rate variability 167
Gut emptying time 61
Gyrinus 153

Habitat selection 14, 353, 474, 500
Habitat use 422
Handling time 61
Hatching asynchrony 43
Heavy metals 113
Herbaceous legume 158
Herbivore feeding preference 95
Herbivore survivorship 14
Herbivory 297, 323, 435
Herbivory tolerance 391
Higher-order interactions 359
Host population regulation 509
Host selection 534
Host/pathogen interaction 509
Host-plant choice 95
Human impact 305

Ideal free distribution 150
Inbreeding 205
Insect distribution 14
Insect galls 14
Insect herbivores 359
Interference 150, 153
Interspecific competition 153
Intrinsic rate of natural increase 383
Ipomopsis aggregate 435

Ladybird beetles 238
Landscape 467
Larix decidua 411
Larval mortality 340
Lead 113
Leaf longevity 80
Leaf orientation 404, 518
Lepomis 8
Life histories 340
Life history strategies 572
Life history tactics 102
Life-histories 383
Life-history trait 288
Light interception 518
Lipids 560
Long shoot 451

Macrophytes 474
Marking 534
Maternal effects 218
Meiofauna 37
Meristematic potential 391
Metabolic turnover 102
Metameric growth 451
Metapopulation 489
Methods 429
Microbotryum violaceum (syn. *Ustilago violacea*) 509
Microcosm 37
Migration 489
Mineral deficiency 70
Model 88
Modular organisms 451
Moisture gradient 300
Molluscs 8
Mortality factors 597
Mosquito egg 353
Mosquitoes 474
Mycorrhiza 218, 550
Mycosphaerella laricinia 411

Nectar 581

Nectarivores 137
Niche breadth 300
Niche overlap 172
Niche segregation 255
Nitrogen 80, 120, 422
Norm of reaction 288
Numerical response 238
Nutrient availability 102
Nutrient effects 556
Nutrient investment 158
Nutrient resorption 120
Nutrient stress 120
Nutrient use efficiency 80
Nutrients 323
Nutritional quality 333
^{15}N 591

Offspring vigor 218
Orientation 483
Ornithoptera priamus poseidon 581
Overcompensation 435
Overfishing 305
Oviposition 238, 474

Panicum virgatum 374
Parasite communities 197
Parasitoids 297
Partitioning thermal resources 127
Patch choice 137
Patch formation 37
Pathogenic fungi 550
Persistence 260
Phacidium infestans 74
Phenotypic plasticity 572
Philopatry 205
Philoponella 457
Phosphorus 80, 422
Photoperiod 21
Photoperiodic response 270
Photosynthesis 70
Photosynthetic apparatus 404
Photosynthetic gas exchange 399
Pica pica 43
Pinus sylvestris 74
Plant chemistry 527
Plant-herbivore interactions 333
Pogonomyrmex 276
Poland 27
Pollination 283
Polygonum persicaria 88
Polygyny 167
Population and community dynamics 246
Population differentiation 483
Population dynamics 359
Potamochoerus porcus 102
Precondition 113
Predation 172, 185, 276
Predator-prey interaction 185
Predator-prey interactions 305, 333
Predator-prey ratios 417
Predators 297
Preferences 581
Preferential settlement 500
Prey consumption 457
Prey profitability 61
Prey-finding ability 340
Primates 383
Pristiphora erichsonii 411

r- and *K*-selection 383
Random walk 246
Randomization 246
Rank concordance 260
Recruitment 500
Regional variation 305
Regworth 435
Reproduction 218, 283
Reproductive effort 21
Reproductive output 21, 276
Reproductive success 255
Reptile ticks 255
Resilience 246
Resprouting 467
Retranslocation 80
Rocky subtidal 305

Salicin 95
Salix 95, 283
Salt marsh 316
Scrub mangroves 399
Seasonality 158
Seed predator abundance 366
Seed set 283
Seedling establishment 50
Seeds 212
Selasphorus rufus 137
Sex ratio 43
Sexual dimorphism 43, 167
Short shoot 451
Shrubs 467
Silene dioica 509
Single-seededness 212
Size 429
Size at reproduction 21
Small-scale spatial distribution 37
Snow cover 27
Spartina alterniflora 316
Spatial density dependence 185
Species richness 197
Spider 597
Spiders 457
Sporobolus virginicus 445
Stable isotope ratios 399
Stable isotopes 1
Statistical tests 246
Stegastes 500
Subpopulations 340
Substitutive experiment 429
Sugar 581
Sulphur dioxide 70
Superparasitism 534
Survival rate 597
Survival time 353
Sus scrofa 167
Sylvia atricapilla 483

Temperature response 270
Territoriality 137
Territory/foraging energetics 137
Tetranychus urticae 270
Three trophic level interactions 359
Time of reproduction 21
Topographic variation 1
Trachypithecus auratus 527
Trade-off 294
Translocation 120
Trophic structure 417

Ungulate mortality 27

VAM 550
Vulpia ciliata 550

Water availability 572
Water effects 556
Water influx 586
Water relations 467
Water stress 120
Water uptake 399
Water use efficiency 1, 399
Waterlogging 445
Weed seeds 88
Weeds 556
West Africa 197
Western Australia 158
Wetland 474
Wolf predation 27

Xanthophyll cycle 404

Zeaxanthin 404
Zooplankton 560